REMARKS

Claims 1-3 are pending in this application.

Claims 1-3 stand rejected under 35 U.S.C §103(a) over Ikushima et al., U.S. Patent No. 4,599,119. This rejection is respectfully traversed.

Ikushima teaches an age-hardening copper titanium alloy containing 2 to 6 % by weight of titanium and composed of a substantially fully solution heat treated structure having an average crystal range size not exceeding 25μm (Abstract). The Office Action asserts that "the instant Cu-Ti alloy composition and second phase elements contents, solution heat treatment, working, and aging steps are overlapped by the cited reference." As such, the Office Action further asserts that the properties claimed would have been inherently possessed by Ikushima (Office Action, page 3, lines 7-13).

As recited in Claim 1, the second-phase particles in the present invention are Cu-Ti-X, where X is one of Pb, Sn, Zn, Mn, Fe, Co, Ni, S, Si, Al, P, As, Se, Te, Sb, Bi, Au, and Ag. In contrast, the second-phase particle in Ikushima is Cu_3Ti (i.e. intermetallic compounds.) Ikushima further teaches that an intermediate annealing is performed at a temperature which is lower than a solid solution-forming temperature and a recrystallization temperature, or in other words, "at a temperature lower than ordinary annealing" <u>in order to achieve the fine and uniform distribution and precipitation of a secondary phase</u> in a master or matrix phase." See column 2, lines 32-39. The specific temperature and time for this intermediate anneal is further defined by Ikushima in column 3, lines 3-9, as being 500°C to 700°C for a period of 1 to 20 hours.

In support that the Ikushima Cu-Ti alloy does not inherently possess the properties of the claimed Cu-Ti alloy, Applicants submit herewith the article "Aging of a Cu-4%Ti Alloy and Annealing Behavior after Cold-Rolling" (Exhibit 1) with a partial translation of the pertinent portions (Exhibit 2). This article describes the effects of aging and annealing on a

Cu-4wt% Ti alloy. (See abstract and page 81, left column, lines 6-13). Photo No. 3 and page 82, left column, lines 10-16 describe what happens to a sample heated at 600° C for various lengths of time as follows:

> Photo No. 3 shows a structure of a sample which was aged at 600° C for 3 hours. It is observed in Photo No. 3 that layered discontinuous precipitated matter was coarsely grown and the direction of growth was different in every crystal grain.
>
> In a sample aged at 600° C for 3 minutes, layered discontinuous precipitated matter which was grown to about 0.2 μm along a part of grain boundaries of a sample was observed. In a sample aged at 600° C for 54 minutes, coarsely grown layered discontinuous precipitated matter covered about 90% of the area.

The article further explains the relationship between temperature and hardness on page 83, right column, lines 1-12, as follows:

> Area rates of discontinuous precipitated matter formed in aging at 450°C and 600°C were obtained by observation with an optical microscope, and the result thereof was plotted with respect to aging time in Fig. 2. Comparing the variation of the average hardness of the entire surface of the sample, which is shown in Fig. 1, the hardness did not increase from the timing at which discontinuous precipitated matter with about 2% was observed in both aging at 450°C and 600°C. When the area rate of the discontinuous precipitated matter reached about 4%, the hardness started to reduce, and the hardness rapidly reduced according to great increase of the area rate. When the area rate reached 80% and the area greatly increased therefrom, the hardness gently reduced.

Therefore, if the aging is performed at 600° C for 3 hours, the area rate of the discontinuous precipitated matter reaches about 90% as shown in Photo No. 3. This results in over-aging, whereby the hardness is lowered and fine precipitated matter which inhibits growth of crystal grain cannot be obtained. Therefore, the fine crystal grain obtained by Ikushima is not caused by the second phase particle (Cu_3Ti), but is instead caused by adjustment of the temperature and the time in the heat treatment. Therefore, Ikushima cannot obtain a second phase particle having an average distance (d) smaller than 10 μm, as described by Applicants in Table 2, page 17, embodiments 3-10.

With respect to the Office Action's assertion that claim 3 contains no invention since it includes a general formula, Applicants respectfully submit that the second phase particle is not defined only by a general formula. Specifically, claim 3 recites that the second-phase particle has a specific density between 1 to 100 particles per 100 μm^2 and that the average distance of the particles is between 2 to 20μm.

In view of the above, Applicants submit that the properties recited in the claims are not inherent in Ikushima. Accordingly, the 35 U.S.C §103(a) rejection is improper and should be withdrawn.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,

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Attachments:
Exhibits 1 and 2
Petition for Extension of Time

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